

INDIANOLA AVENUE SUPPLEMENTAL PARKING OBSERVATIONS MEMORANDUM

To: Reynaldo Stargell, Traffic Management Administrator
Robert Ferrin, Assistant Director, Parking Services

From: Justin Goodwin, Transportation Planning Manager
Emma Kogge, Transportation Planner

Date: 12/06/2021

Subject: Parking Observations on Indianola Avenue (Hudson St. to N Broadway)

Category: Planning

I. SUMMARY

Additional parking counts were collected for the Indianola Avenue Complete Streets Study in response to public concerns with proposed parking removal as part of the study's recommendation. The study was undertaken by the Department of Public Service to assess lane reconfiguration on Indianola Avenue/U.S. 23 from Hudson Street to N Broadway in conjunction with a planned urban repaving project (FY2024). The following memorandum outlines the supplemental parking counts, findings, and recommendation for parking configuration in the corridor.

II. BACKGROUND

On September 16, 2021, Department of Public Service – Division of Traffic Management staff held two virtual public meetings to present findings and a recommended concept for the Indianola Avenue Complete Street Study. Results of a parking utilization study were presented (Appendix A), documenting significant underutilization of on-street parking throughout the study area (Hudson Street to North Broadway), with exception of street blocks in the immediate vicinity of the business area located between Weber Road and Midgard Road, which experience a more consistent and higher parking demand.

Based on these findings, as well as those from the project crash analysis and traffic capacity analysis, staff presented a recommended concept for a roadway lane reconfiguration that would add bike lanes while maintaining over half of the existing available on-street parking spaces. The lane reconfiguration would be implemented in conjunction with a planned ODOT resurfacing project in 2023.

In the originally proposed scenario (Alternative 4) most of the corridor would be reconfigured with bike lanes and parking on one side of the street, with exception of three blocks between Weber Road and Midgard Road, which would retain parking on both sides of the street. Bike lanes would transition to mixed traffic in this area. This was a compromise solution informed by input from business members of the Advisory Committee and other public engagement out of concern for parking reduction in the business area.

III. COMMUNITY CONCERNS

During the August 31st project Advisory Committee meeting and the September 16 public meetings, some residents and business owners along Indianola Avenue and within the immediate area expressed concern with the potential loss of any on-street parking on Indianola Avenue. Meeting attendees also expressed concern with the parking study having been conducted using data gathered during COVID-19 pandemic conditions and the potential documentation of atypical parking demand. Some attendees requested that any loss of on-street parking be eliminated from further consideration. Others requested additional data collection to confirm feasibility of proposed parking reductions.

Specific concerns raised include:

- Potential overflow parking impacting residential side streets
- Potential need to create permit parking zone (an existing zone is designated on Crestview Avenue)
- Impacts to business patronage or employee access to parking
- Parked cars blocking residential driveways (cited as an existing condition)

A public comment period was open from September 17 to October 6, 2021 with comments accepted until the end of October. 186 public comments were received, with 75% in support of bike lanes, traffic calming, or protected bike infrastructure. Many comments cited concerns of bicyclists transitioning from bike lanes to shared lanes in the business district section, and stressed the need for a complete bike facility to ensure safety of all users. Approximately 22% of comments were against the removal of parking along the corridor.

In response to public feedback, a supplemental parking study was conducted in order to provide a more up-to-date assessment of parking demands in the corridor. Project staff and consultants also re-examined the feasibility of providing a continuous bicycle facility through the corridor.

IV. REVISED CONCEPTS

Two alternatives were analyzed for parking impacts based on the supplemental parking study (see Section V below).

Alternative 5a re-examined the potential for a continuous two-way cycle track with parking on one side of the street. This was deemed infeasible due to sight distance impacts that would require a more significant reduction of parking than supported by observed demand, as well as traffic signal and intersection capacity impacts.

Alternative 5b is similar to Alternative 4 but would eliminate the gap in the bicycle facility between Weber Road and Midgard Road, with parking eliminated on the east side of the street. Parking would be maintained along the west side of the street from Parkview Drive to North Broadway, with the peak period parking restriction removed. Removal or relocation of the median between Melrose and Milford Avenues is necessary to maintain parking on the west side and provide continuous bike lanes on both sides of the street. Some additional parking would also be removed in the portion of Indianola from Hudson to Arcadia to accommodate a north-bound buffered bike lane. Buffered bike lanes would also be provided across the Glen Echo Bridge.

Approximately 108 spaces would be retained throughout the corridor (the specific number of spaces is dependent on adjustments to bus stop locations and other dimensional details to be refined in design). Based on the supplemental parking study documented in this memo, the number of spaces maintained in this scenario is consistent with both the average parking utilization and maximum observed parking demands observed in the project area. The *proposed* number of parking spaces as indicated in the following sections represents the estimated number of spaces provided in Alternative 5b.

V. SUPPLEMENTAL PARKING COUNTS

Based on community concerns noted above, staff conducted additional supplemental parking utilization data collection efforts totaling 25 observation periods over 10 days (see Appendix B for complete data tables). These observational periods included:

- a. Four time blocks on Saturday, September 18, 2021:
Weather conditions: clear, average temperature: 77°F
 - Morning – 8:00 – 9:30 a.m.
 - Mid-Day – 12:00 – 2:00 p.m.
 - Early Evening – 6:00 – 7:00 p.m.
 - Late Evening – 10:00 – 11:00 p.m.
- b. Two time blocks on Sunday, September 19, 2021:
Weather conditions: clear, average temperature: 76°F
 - Late Morning – 11:30 a.m. – 12:00 p.m.
 - Mid-Day – 1:45 – 2:15 p.m.
- c. One time block on Monday, September 20, 2021:
Weather conditions: clear, average temperature: 75°F
 - Early Evening – 6:30 p.m.
- d. One time block on Wednesday, September 22, 2021:
Weather conditions: light rain, average temperature: 62°F
 - Early Evening – 6:00 p.m.
- e. One time block on Thursday, September 23, 2021:
Weather conditions: light rain, average temperature: 54°F
 - Early Evening – 6:00 p.m.
- f. Two time blocks on Friday, September 24, 2021:
Weather conditions: clear, average temperature: 61°F
 - Early Evening – 6:15 – 7:00 p.m.
 - Late Evening – 9:00 – 9:30 p.m.

- g. Five time blocks on Saturday, September 25, 2021:
Weather conditions: clear, average temperature: 60°F
 - Morning – 8:00 – 9:00 a.m.
 - Mid-Day – 2:00 – 2:45 p.m.
 - Early Evening – 5:00 – 5:30 p.m.
 - Early Evening – 7:00 p.m.
 - Late Evening – 11:00 p.m.
- h. Two time blocks on Thursday, September 30, 2021:
Weather conditions: clear, average temperature: 63°F
 - Early Evening – 6:00 – 6:30 p.m.
 - Late Evening – 9:00 p.m.
- i. Three time blocks on Friday, October 1, 2021:
Weather conditions: clear, average temperature: 63°F
 - Morning - 7:00 a.m.
 - Early Evening – 7:30 p.m.
 - Late Evening – 9:45 p.m.
- j. Four time blocks on Saturday, October 2, 2021:
Weather conditions: clear, average temperature: 64°F
 - Mid-Day – 2:30 p.m.
 - Early Evening – 6:00 p.m.
 - Early Evening – 7:00 p.m.
 - Late Evening – 9:15 p.m.

VI. METHODOLOGY

Data collection occurred via field observation (walk audits and windshield surveys) and manual recording of parking occupancy (total number of parked vehicles by block). Manual counts were supplemented by photo and/or video documentation of all street blocks during each observation period (photo documentation in Appendix C). Parking turnover rates were not recorded; however, observations and photo documentation do indicate areas with more or less frequent turnover (see section VIII: Key Findings and Field Observations). Counts were limited to on-street parking on Indianola Avenue within the project study area (North Broadway to Hudson Street). Counts were not conducted on side streets; however, parking conditions on portions of sides streets in immediate proximity to Indianola Avenue were photo documented (see Appendix C).

Data Analysis

Table 1 on the following page shows the bi-directional counts (including both sides of each block) for the observation period, as well as the average original parking study counts conducted in September 2020 and April 2021. The mode, average, maximum observed time block, maximum observed per block, proposed spaces to be maintained, and existing inventory are also listed in Table 1 on the following page. Proposed spaces represents the estimated number of spaces per block to be provided in Alternative 5b as described above.

Figure 1 on page 6 depicts the observed total parking counts per time block along with averages for the study counts, proposed parking spaces, and existing parking spaces.

Table 1. Bi-Directional Parking Utilization

Sat 9/18 thru Sat 10/2 Block (Bi-Directional)	*Study Counts (Average)	INDIANOLA AVENUE PARKING UTILIZATION (No. of Spaces)					
		Mode	Average	**Maximum observed in one period	***Maximum observed per block over 10 day period	****Proposed (Estimate)	Existing
Hudson to Arcadia	2	5	5	7	12	0	63
Arcadia to Cliffside	4	6	6	3	18	0	22
Parkview to Olentangy	0	1	2	2	5	+/-8	14
Olentangy to Kelso	2	1	2	1	8	+/-8	18
Kelso to Crestview	8	7	9	11	15	+/-9	18
Crestview to Tulane	4	5	4	1	10	+/-9	12
Tulane to Tibet	1	2	2	4	5	+/-9	18
Tibet to Weber	6	5	5	3	9	+/-6	12
Weber to Melrose	7	3	6	15	15	+/-7	14
Melrose to Milford	10	12	10	24	24	+/-10	20
Milford to Midgard	10	11	12	21	21	+/-14	26
Midgard to Como	8	2	2	3	5	+/-11	21
Como to Walhalla	4	3	3	5	6	+/-7	14
Walhalla to Clinton Hts	5	7	6	6	10	+/-4	13
Clinton Hts to N Broadway	4	1	2	1	7	+/-6	14
TOTAL OCCUPANCY	75	71	76	107	170	+/-108	299

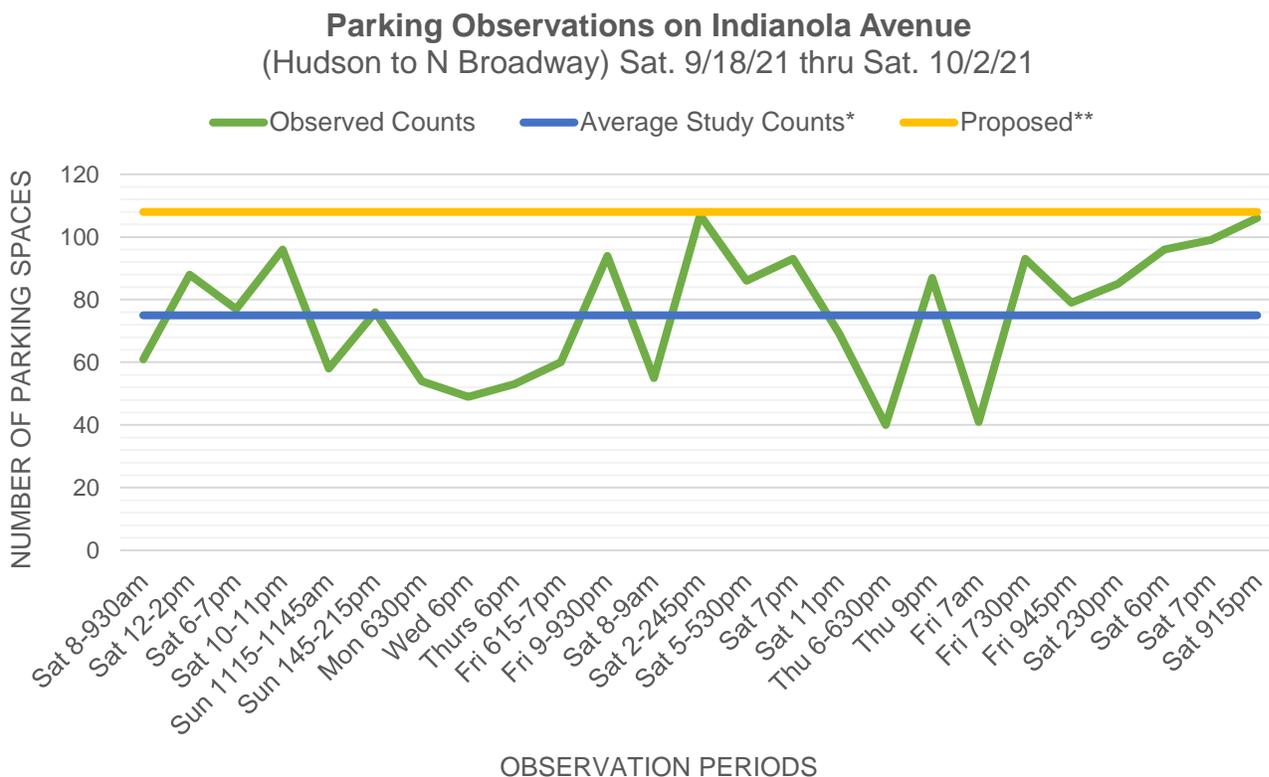
*Parking counts were originally collected during two time periods on Friday, September 25, 2020, Saturday, September 26, 2020; and one time period on Wednesday, April 14, 2021.

**Maximum observed corresponds to the highest utilization observed across the full corridor in a single period (Sat. 9/25/21 from 2:00 – 2:45 p.m.) during the 10-day observation period.

***Maximum observed per block accounts for the highest observed parking utilization over the 10-day, 25 observation periods on each individual block, regardless of time period. The Total Occupancy represents an aggregate of multiple different time periods.

****The proposed number of spaces are estimated at this time and will be refined during project design. Spaces could be added or removed based upon sight distance and bus stop locations.

Figure 1. Parking Observations on Indianola Avenue



*Average of parking counts collected in September 2020 and April 2021.

** The proposed number of spaces are estimated at this time and will be refined during project design. Spaces could be added or removed based upon sight distance and bus stop locations.

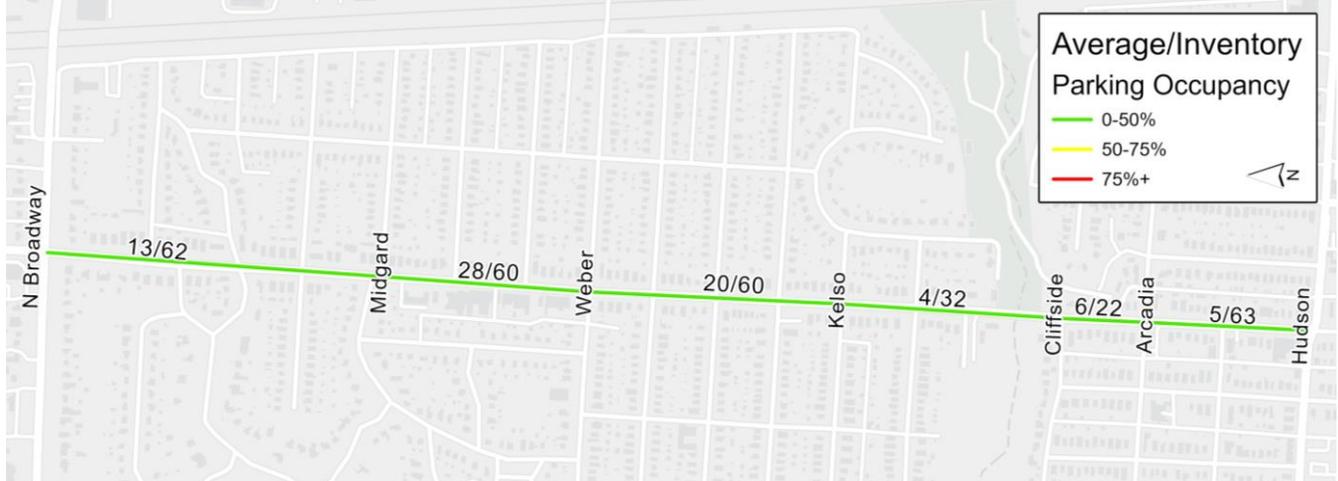
VII. TYPICAL PARKING DEMAND

The maps represented in Figures 2 and 3 on the following pages illustrate typical (average) utilization, maximum (single period) utilization, existing total parking inventory, and proposed parking inventory under the revised corridor concept (Alternative 5b). Segments of the corridor with consistently higher parking demand are located between Kelso Road and Midgard Avenue. The segment represented by the three blocks between Weber Road and Midgard Road is the only segment observed to reach maximum occupancy, associated with the business activity in this area.

In the revised corridor concept, parking would be eliminated from the east side of Indianola Avenue, dropping the per-block parking inventory by approximately half in these segments. During the maximum observation period, a total of 79 vehicles were observed within this core parking demand area (60 between Weber Road and Midgard and 19 between Weber Road and Kelso Road). This indicates an opportunity for blocks immediately south of Weber Road to absorb some of the parking demand between Weber Road and Midgard. Similarly, the segment north of Midgard is consistently underutilized, representing an opportunity to absorb additional demand.

Figure 2 demonstrates the average parking occupancy on Indianola Avenue from Hudson St to N Broadway St. The average parking occupancy compared to the number of existing spaces is below 50% on the corridor.

Figure 2. Typical (Average*) Parking Demand as compared to Existing Available Spaces



*Average represents the cumulative per block average and may not correspond to segment maximums shown on in other figures.

Figure 3 shows the highest observed parking demand recorded on a Saturday afternoon during the observation periods versus the current number of existing parking spaces. Parking occupancy is well below 50% on much of the corridor, except for the business district area from Midgard to Weber. During this observation period, this area was fully parked. However, average occupancy in this area was 45% during the study period. Figure 3 also depicts the proposed number of spaces within 1-3 blocks of the core business area.

Figure 3. Proposed Parking Spaces and Maximum Observed Occupancy*



*Final number may fluctuate slightly up or down during design.

*Maximum observed corresponds to the highest utilization observed across the full corridor in a single period (Sat. 9/25/21 from 2:00 – 2:45 p.m.) during the 10-day observation period.

VIII. KEY FINDINGS AND FIELD OBSERVATIONS

Some blocks were rarely and often minimally parked. Of the 15 blocks (31 individual block faces) within the study area, 18 out of 31 consistently had 2 or fewer parked vehicles during any given observation period. This amounts to a 7% typical utilization rate. These blocks include: Hudson to Arcadia (both sides), Parkview/Glen Echo Bridge to Olentangy (both sides), Olentangy to Kelso (both sides), Crestview to Tulane (east side), Tulane to Tibet (both sides), Tibet to Weber (west side), Weber to Melrose (east side), Midgard to Como (both sides), Como to Walhalla (both sides), Clinton Heights to North Broadway (both sides). 11 blocks typically had zero parked vehicles.

Parking utilization averaging routinely between 50% and 60% was observed on the west side of Crestview to Tulane, the east side of Melrose to Milford, the west side of Milford to Midgard, and the west side of Walhalla to Clinton Heights. Average utilization rates for each block did not exceed 58%.

The highest parking demand was consistently observed between Weber and Midgard; and Kelso and Crestview. Consistent with the original parking utilization study and with other field observations, the highest demand for on-street parking is associated with the businesses located between Weber Road and Milford Avenue. A variety of business are located in this block, with varied operating times. The Studio 35 Cinema and Draft House is the highest capacity and latest operating venue. Consistent parking was also observed from Kelso Road to Crestview Road nearby the Crest restaurant. Parking demand in these areas increases throughout the day, particularly on the weekends. At peak demand times, parking is at or near capacity in the blocks between Weber and Midgard.

During the observation periods, parking utilization to the north and south of these street segments were well below capacity, on average utilizing 25% of available parking. The highest utilization observed during a single period is approximately 36% or 107 out of 299 available spaces used. The business district from Weber to Midgard was observed to be at capacity during only 1 out of the 25 observation periods. The next highest utilization period in this area was observed at 37 out of the 60 available spaces.

On-Street parking in the commercial blocks consistently included all day/overnight, residential vehicles. The most utilized parking is on blocks (Weber to Melrose, Melrose to Milford, Milford to Midgard, and to a lesser extent, Crestview to Kelso) that are either directly adjacent to or within a short walk of local businesses. Melrose to Milford typically had the highest overall utilization in the business district, exceeding 50% utilization during roughly half of the observed time periods. All of the business are located on the west side of the street and all, with the exception of one (The Crest Tavern), are located between Weber and Milford. The east side of the street is entirely residential. In the case of The Crest, residential structures line the remainder of the west side as well.

Field observations and photo documentation revealed that numerous vehicles parked within these business areas appear to be those of residents living in (or visitors to)

adjacent residential buildings or in residences located directly across the street on Indianola. Numerous specific vehicles were observed in the same locations over multiple observation periods and across multiple days. In some cases, residential vehicle owners were directly observed arriving or departing.

This parking activity presents an inefficient use of available on-street parking in the business areas. Additional spaces on Indianola Avenue could be made more available for business patrons if residential parking instead occurred on side streets or off-street (see below).

Nearly all residential structures along Indianola have alley accessed, off-street parking. Many of the residences along Indianola Avenue within the study area are multi-family buildings (either multi-unit apartments, or single-family structures converted to multi-family). 61 homes are single-family residences. Nearly all of these residential buildings have access to private off-street parking, typically accessed via the rear alley. Some residences north of Milford Avenue have front-loaded driveways accessed from Indianola. Although it is unclear if each building has sufficient off-street parking to accommodate the number of vehicles owned by all occupants, many driveways and parking areas were observed to have available unused space during the observation periods.

IX. OTHER CONSIDERATIONS

It should be noted that observations during the supplemental study period are not necessarily representative of parking demand within the study area under all circumstances. In particular, special events periodically conducted by local business can be expected to draw more patrons than on a typical day. For example, a recent Labor Day weekend event (held on Monday, September 6, 2021) was observed to have generated higher on-street parking demand than normal (counts were not conducted). Popular movie premiers or special promotional events at the cinema can be expected to generate additional parking demand on a periodic basis. While it is difficult to quantify every potential parking demand scenario, the ratio of utilized and unused spaces observed during the study periods, combined with the proposed concept that preserves approximately 36% of existing on-street parking spaces, indicates that parking needs will be sufficiently accommodated for typical day and periodic high demand scenarios.

Bicycle, Micro-Mobility and Pedestrian Activity

During field observations, bicyclists and/or e-scooter riders were observed during most observation periods, including after dark (refer to photo documentation in Appendix C). During some observation periods, pedestrians, joggers and/or parents with strollers were observed using the street instead of the sidewalk, likely due to a combination of narrow sidewalk width and uneven conditions. Deteriorated sidewalk and curb conditions were photo documented (Appendix C). The Division of Design and Construction will determine the extent of curb and integrated sidewalk repair to be included in the resurfacing project once the project enters the design phase. Additional sidewalk repairs beyond the scope of the resurfacing project would be subject to future funding requests.

Data collected over a 24-hour period in 2020 documented 110 cyclists traveling along Indianola Avenue through the study area. This represents both northbound and

southbound trips; as such, the data may represent individual cyclists making both a northbound and southbound trip at different times of the day. However, in terms of total number of trips, more bicycle trips were observed than were vehicles parked on Indianola during the most intensively parked observation periods. Bicycle counts were also collected earlier this year on the northern portion of Indianola Avenue where bike lanes exist from Oakland Park Ave. to Morse Rd. 52 bicyclists were recorded using the bike lanes on a typical weekday in June 2021.

Economic Impact of Bicycle Facilities

Many cities across the U.S. have experienced positive economic impacts when replacing parking lanes with bike lanes. Research shows that bicyclists make more frequent stops at local businesses than car drivers. Though drivers may spend more per trip, bicyclists spend more overall.¹ After installation of a protected bike lane in Salt Lake City, UT, sales rose 8.8% despite a 30% loss of on-street parking.² The revitalization of Broad Avenue in Memphis, TN expanded to include bike lanes, which led to traffic calming and increased business growth.³ Retail sales increased with the installation of bike lanes and reduction of parking lanes in Minneapolis, MN.⁴ Studies show either no impact or positive impact on economic activity when bike lanes are introduced, even with the removal of parking spaces.

X. RECOMMENDATION

The recommended alternative as presented to the public in September was revised based upon public feedback and additional parking utilization study in the corridor. Public comments received since the public meetings reveal a perception that there is insufficient parking on Indianola Avenue that will lead to increased parking on side streets such as Melrose Ave and Milford Ave. Data collected during observation periods supports the previously collected data, which indicates a typical parking demand using approximately 25% of the existing spaces throughout the corridor and roughly 45% of the existing spaces in the business district between Weber and Midgard.

The proposed number of spaces with the lane reconfiguration and recommended alternative will closely match the highest observed parking utilization periods. It is estimated that 108 parking spaces will remain with the proposed project; this number could shift slightly due to possible bus stop relocations and design refinements that may either add or remove a small number of parking spaces. The final number of spaces to be preserved will be determined through the design process.

¹ Jaffe, E. 2015, March 13. The Complete Business Case for Converting Street Parking Into Bike Lanes. Bloomberg CityLab. <https://www.bloomberg.com/news/articles/2015-03-13/every-study-ever-conducted-on-the-impact-converting-street-parking-into-bike-lanes-has-on-businesses>

² Quednau, R. 2018, June 4. How Bike Lanes Benefit Businesses. Strong Towns. <https://www.strongtowns.org/journal/2018/5/31/how-bike-lanes-benefit-businesses>

³ Flusche, D. 2012, July. Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure. Advocacy Advance – League of American Bicyclists. https://bikeleague.org/sites/default/files/Bicycling_and_the_Economy-Econ_Impact_Studies_web.pdf

⁴ Liu, J. 2019, June 30. Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility – A Multi-City Multi-Approach Exploration. National Institute for Transportation and Communities. <https://nitc.trec.pdx.edu/research/project/1161>

Indianola Avenue Supplemental Parking Observations Memorandum
Appendices

APPENDICES

Appendix A: Parking Utilization Study

Indianola Avenue Complete Streets Study – Task 5 Parking Utilization Assessment

Overview

The City of Columbus has provided Michael Baker International with parking utilization counts for the following times:

- 2pm and 7pm on Friday, September 25th, 2020
- 2pm and 7pm on Saturday, September 26th, 2020
- 10pm on Wednesday, April 14th, 2021

The Indianola Avenue Complete Streets Study is investigating ways of calming traffic along this segment of Indianola Ave., as well as add additional amenities. The project study area is approximately 1.2 miles of Indianola Ave. between Hudson St. and North Broadway. The parking utilization was analyzed to determine what impacts there would be due to reductions to existing available parking.

Parking Utilization Count Summary

Counts were taken at various times and days to capture the different parking make-up. After the counts were analyzed, three distinct segments became apparent where parking was higher at different times. These segments are Hudson St. to Weber Rd., Weber Rd. to Midgard Rd., and Midgard Rd. to North Broadway. These segments and times, shown in **Table 1** below, were used to assess the impacts.

Table 1. Parking Availability and Parking Usage

Block Identification	Existing Spaces Available		Sept. 26th - 2pm	Sept. 26th - 7pm	Percent Utilization
	West Side (SB)	East Side (NB)	Bi-Direction	Bi-Direction	
Hudson St to Duncan St	16	33	-	4	6%
Duncan St to Arcadia Ave	14				
Arcadia Ave to Cliffside Dr	11	11	-	6	27%
Cliffside Dr to Olentangy St	8	6	-	0	0%
Olentangy St to Kelso Rd	8	10	-	2	11%
Kelso Rd to Crestview Rd	9	9	-	13	72%
Crestview Rd to Tulane Rd	6	6	-	3	25%
Tulane Rd to Tibet Rd	9	9	-	1	6%
Tibet Rd to Weber Rd	6	6	-	8	67%
Weber Rd to Melrose Ave	7	7	10	-	71%
Melrose Ave to Milford Ave	10	10	13	-	65%
Milford Ave to Midgard Rd	14	12	13	-	50%
Midgard Rd to Como Ave	11	10	-	4	19%
Como Ave to Walhalla Rd	7	7	-	5	36%
Walhalla Rd to Clinton Heights	4	9	-	5	38%
Clinton Heights to N. Broadway	6	8	-	5	36%
TOTAL	146	153	36	56	31%

A table of the full parking data provided by the City is included in **Appendix A**. Additionally, **Appendix B** shows a geographic representation of the data.

As shown in **Table 1**, there are a 146 existing parking spaces on the west side and 153 existing parking spaces on the east side, for a total of 299 existing parking spaces along the corridor. The highest overall parking utilization location occurs between Tibet Rd. and Milford Ave. with an average occupancy of at least 50%. The highest bi-directional utilization within a single block was observed between Kelso Rd and Crestview Rd. with 72% of the available parking spaces being occupied. This high parking occupancy aligns with the location of the various businesses on the west side of Indianola Ave.

Parking Removal Analysis

A total of 299 parking spaces are present within the corridor study area. If all parking were to be removed, approximately 83 vehicles at most, as seen during the highest observed timeframe, would be required to find alternative parking, likely via side streets.

If parking were to be reduced on one side, the total number of remaining parking spaces, approximately 150, would be able to accommodate the parking demand, 83 during the highest observed count. However, as **Table 1** shows, the parking is clustered around the Tibet Rd to Midgard Rd segment of Indianola Ave. Reducing parking in this segment would force the excess vehicles to side streets or to inconvenient blocks farther away along Indianola Ave.

Although the number of available parking spaces that would remain from removing parking on one side of the road seems feasible when considering the entire corridor, it is understood that removing parking on both sides within the vicinity of the existing business district would create an unacceptable burden. To alleviate this burden, a hybrid parking application was developed. In this application, parking is proposed to be removed at the following locations along Indianola Ave:

Hybrid Parking Removal

- West side between Hudson Ave. and Arcadia Ave.
- Both sides between Arcadia Ave. and Cliffside Dr.
- East Side between Cliffside Dr. and Weber Rd.
- No removal between Weber Rd. and Midgard Ave.
- West Side between Midgard Ave. and 300' south of North Broadway

Appendix A compares the observed parking counts with the parking that will remain.

Economic Considerations

An expected concern related to loss of parking supply is that patronage will be reduced to various businesses that rely on the removed street parking. Industry literature and studies were researched to determine the expected effect on businesses when parking supply was converted to bicycle and pedestrian accommodations. Portland State University's Transportation Research and Education Center in Oregon conducted a study entitled *Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility: A Multi-City Multi-Approach Exploration*, examining 14 corridors in six cities before and after parking was converted to bicycle and pedestrian street improvements. What the study overwhelmingly found was that the bicycle and pedestrian improvements had either a positive or non-significant impact on corridor employment and sales. Specifically, even in cases where a motor vehicle travel lane or parking was removed, food sales and employment tended to increase.

Recommendations

Due to the observed parking demand, the project team recommends that the parking be removed as detailed in the "Hybrid Parking Removal" shown above, understanding that the final parking count may be slightly higher or lower as determined by final design elements.

Appendix A:

Parking Count Data

Block Identification	Existing Spaces		Spaces to Remain		September 25th - 2pm		September 25th - 7pm		September 26th - 2pm		September 26th - 7pm		April 14th - 10pm					
	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)	West Side (SB)	East Side (NB)				
Hudson St to Duncan St	16	33	16	0	0	0	0	2	0	0	0	0	0	1				
Duncan St to Arcadia Ave	14		14	0	1		2		0	0	4		0	1				
Arcadia Ave to Cliffside Dr	11	11	0	0	0	0	0	2	1	1	3	3	3	6				
Cliffside Dr to Orlentangy St	8	6	8	0	0	0	1	0	1	0	0	0	1	0				
Orlentangy St to Kelso Rd	8	10	8	0	0	0	1	2	0	4	0	2	0	0				
Kelso Rd to Crestview Rd	9	9	9	0	1	1	6	5	11	3	4	5	8	3				
Crestview Rd to Tulane Rd	6	6	6	0	2	3	3	3	6	2	3	1	2	3				
Tulane Rd to Tibet Rd	9	9	9	0	1	1	0	0	2	1	3	0	1	0				
Tibet Rd to Weber Rd	6	6	6	0	2	1	3	5	1	6	5	3	8	2				
Weber Rd to Melrose Ave	7	7	7	7	5	6	11	6	3	9	4	6	10	2				
Melrose Ave to Milford Ave	10	10	10	10	7	6	13	4	5	6	7	13	4	5				
Milford Ave to Midgard Rd	14	12	14	12	1	2	3	7	2	9	9	4	13	7				
Midgard Rd to Como Ave	11	10	0	10	0	1	1	0	1	4	1	5	3	1				
Como Ave to Walhalla Rd	7	7	0	7	1	0	1	3	5	8	1	3	4	2				
Walhalla Rd to Clinton Heights Ave	4	9	0	9	2	1	3	2	1	3	4	7	2	3				
Clinton Heights Ave to North Broadway	6	8	0	8	0	2	2	1	7	8	0	2	1	4				
TOTAL	146	153	107	63	23	24	47	41	36	38	40	78	39	44	83	22	38	60

Appendix B:

Parking Occupation Maps

Indianola Parking

Sep. 25 - 2pm

- 0
- 1
- 2
- 3
- 4 - 7

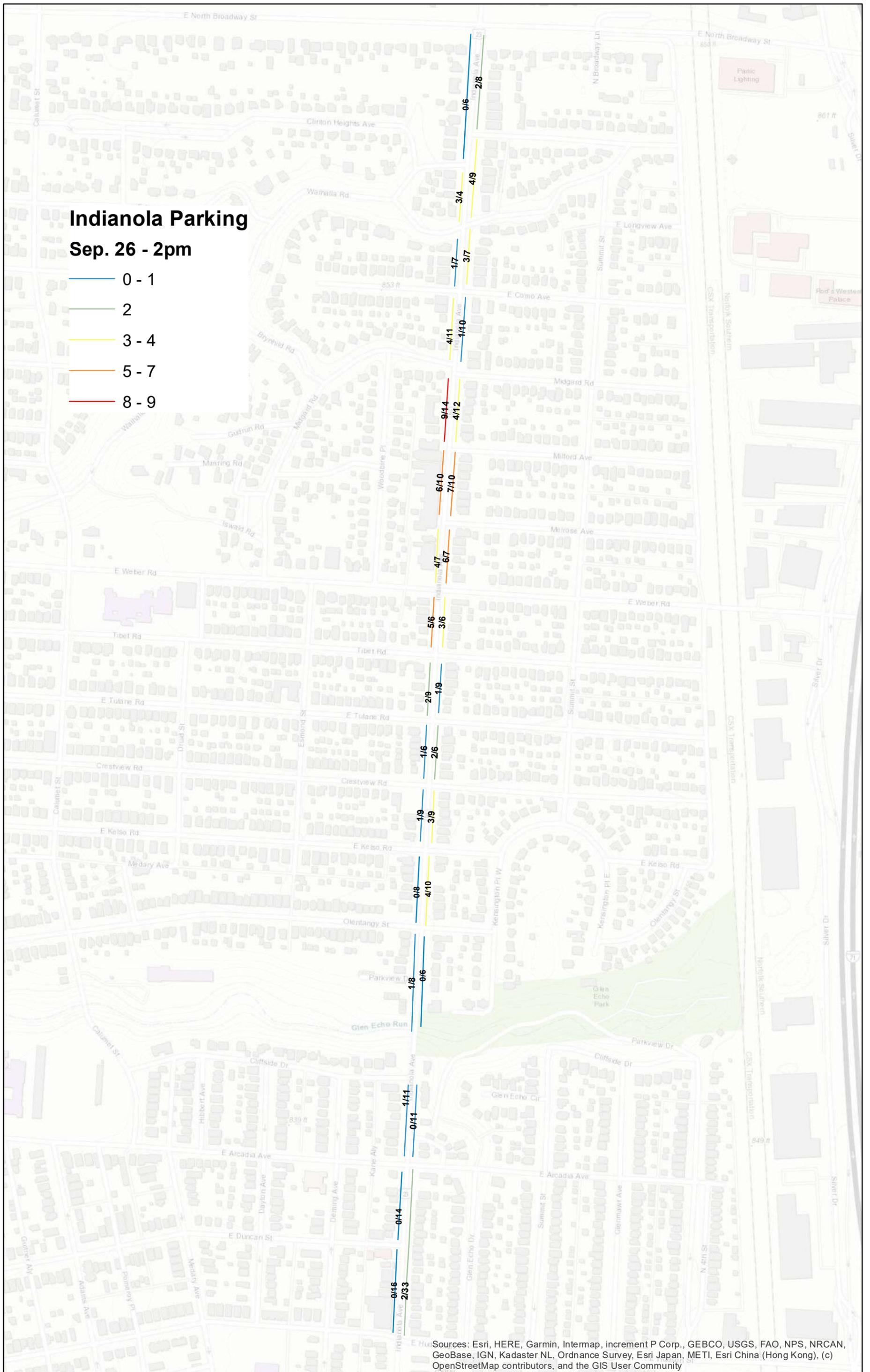


Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Indianola Parking

Sep. 26 - 2pm

- 0 - 1
- 2
- 3 - 4
- 5 - 7
- 8 - 9



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Indianola Parking

Sep. 26 - 7pm

- 0 - 1
- 2
- 3
- 4 - 5
- 6 - 9



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Indianola Parking

Apr. 14, 2021

- 0 - 1
- 2
- 3
- 4
- 5 - 6



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Indianola Avenue Supplemental Parking Observations Memorandum
Appendices

Appendix B: Supplemental Parking Counts Table

INDIANOLA AVENUE SUPPLEMENTAL PARKING COUNTS		Sat 9/18/21				Sun 9/19/21		Mon 9/20/21
		8-930am	12-2pm	6-7pm	10-11pm	11:15-11:45am	1:45-2:15pm	6:30pm
Block	Side							
Hudson to Duncan	West	0	1	0	5	0	0	0
Hudson to Arcadia	East	1	7	5	7	5	5	0
Duncan to Arcadia	West	0	3	1	0	0	3	0
Arcadia to Cliffside	East	2	3	2	2	4	1	0
Arcadia to Cliffside	West	5	3	4	5	2	5	4
Parkview to Olentangy	East	1	2	1	0	0	1	0
Parkview to Olentangy	West	2	1	2	1	1	0	0
Olentangy to Kelso	East	1	1	0	1	0	0	1
Olentangy to Kelso	West	0	0	2	1	1	1	0
Kelso to Crestview	East	5	4	3	5	4	3	4
Kelso to Crestview	West	2	5	5	5	6	4	0
Crestview to Tulane	East	0	0	0	0	0	0	1
Crestview to Tulane	West	2	2	4	3	5	3	1
Tulane to Tibet	East	0	0	0	0	0	0	0
Tulane to Tibet	West	1	2	3	1	2	3	0
Tibet to Weber	East	2	4	4	4	4	3	2
Tibet to Weber	West	3	2	1	1	3	3	2
Weber to Melrose	East	4	6	4	7	2	5	0
Weber to Melrose	West	3	6	3	2	1	3	8
Melrose to Milford	East	5	6	4	8	1	4	8
Melrose to Milford	West	0	6	2	2	1	5	7
Milford to Midgard	East	4	6	6	8	3	8	2
Milford to Midgard	West	3	5	7	10	1	6	10
Midgard to Como	East	1	2	2	4	2	2	2
Midgard to Como	West	0	0	1	0	0	1	0
Como to Walhalla	East	1	2	1	3	1	2	0
Como to Walhalla	West	2	0	2	2	1	1	0
Walhalla to Clinton Hts	East	5	4	5	6	3	3	0
Walhalla to Clinton Hts	West	3	3	2	2	3	0	2
Clinton Hts to EN Broadway	East	3	2	1	1	2	1	0
Clinton Hts to EN Broadway	West	0	0	0	0	0	0	0
TOTAL OCCUPANCY		61	88	77	96	58	76	54

INDIANOLA AVENUE SUPPLEMENTAL PARKING COUNTS					
		Wed 9/22/21	Thurs 9/23/21	Fri 9/24/21	
Block	Side	6pm	6pm	6:15-7pm	9-9:30pm
Hudson to Duncan	West	1	0	0	1
Hudson to Arcadia	East	1	1	1	0
Duncan to Arcadia	West	0	0	0	1
Arcadia to Cliffside	East	0	0	1	9
Arcadia to Cliffside	West	3	4	1	7
Parkview to Olentangy	East	0	0	0	1
Parkview to Olentangy	West	0	1	4	4
Olentangy to Kelso	East	0	0	2	3
Olentangy to Kelso	West	0	0	0	0
Kelso to Crestview	East	1	0	2	6
Kelso to Crestview	West	7	7	7	6
Crestview to Tulane	East	1	2	0	4
Crestview to Tulane	West	3	3	5	5
Tulane to Tibet	East	0	0	0	0
Tulane to Tibet	West	4	1	4	2
Tibet to Weber	East	0	0	0	1
Tibet to Weber	West	3	1	3	2
Weber to Melrose	East	0	1	0	6
Weber to Melrose	West	2	3	3	1
Melrose to Milford	East	2	4	4	6
Melrose to Milford	West	5	7	8	4
Milford to Midgard	East	1	0	1	8
Milford to Midgard	West	8	11	9	7
Midgard to Como	East	0	0	0	1
Midgard to Como	West	0	2	0	1
Como to Walhalla	East	0	0	0	0
Como to Walhalla	West	2	1	2	2
Walhalla to Clinton Hts	East	2	2	0	1
Walhalla to Clinton Hts	West	3	2	2	3
Clinton Hts to EN Broadway	East	0	0	1	2
Clinton Hts to EN Broadway	West	0	0	0	0
TOTAL OCCUPANCY		49	53	60	94

INDIANOLA AVENUE SUPPLEMENTAL PARKING COUNTS		Sat 9/25/21					Thu 9/30/21	
		8-9am	2-2:45pm	5-5:30pm	7-7:10pm	11pm	6-6:30pm	9pm
Block	Side							
Hudson to Duncan	West	0	0	3	0	0	0	1
Hudson to Arcadia	East	2	3	0	6	4	0	8
Duncan to Arcadia	West	0	4	2	0	0	0	0
Arcadia to Cliffside	East	6	3	3	3	8	0	11
Arcadia to Cliffside	West	3	0	1	0	1	0	7
Parkview to Olentangy	East	0	0	0	0	0	0	1
Parkview to Olentangy	West	2	2	3	3	1	2	0
Olentangy to Kelso	East	0	1	3	3	3	0	0
Olentangy to Kelso	West	0	0	0	0	0	1	5
Kelso to Crestview	East	3	4	8	8	7	0	2
Kelso to Crestview	West	3	7	6	7	4	6	5
Crestview to Tulane	East	0	1	1	1	1	1	1
Crestview to Tulane	West	3	0	5	5	2	4	3
Tulane to Tibet	East	1	2	0	1	0	0	2
Tulane to Tibet	West	3	2	3	3	2	0	0
Tibet to Weber	East	2	1	6	7	4	1	4
Tibet to Weber	West	3	2	3	1	1	1	0
Weber to Melrose	East	2	7	2	2	2	0	2
Weber to Melrose	West	1	8	1	2	0	3	0
Melrose to Milford	East	3	11	6	5	5	1	7
Melrose to Milford	West	2	13	9	7	2	7	5
Milford to Midgard	East	1	8	3	7	4	0	4
Milford to Midgard	West	3	13	8	7	6	7	7
Midgard to Como	East	1	2	0	1	2	0	1
Midgard to Como	West	1	1	0	2	0	0	0
Como to Walhalla	East	0	2	2	3	2	0	4
Como to Walhalla	West	3	3	3	3	3	3	1
Walhalla to Clinton Hts	East	4	3	2	4	1	1	3
Walhalla to Clinton Hts	West	2	3	3	2	3	2	1
Clinton Hts to EN Broadway	East	0	1	0	0	1	0	2
Clinton Hts to EN Broadway	West	1	0	0	0	0	0	0
TOTAL OCCUPANCY		55	107	86	93	69	40	87

INDIANOLA AVENUE SUPPLEMENTAL PARKING COUNTS		Fri 10/1/21			Sat 10/2/21			
		7am	7:30pm	9:45pm	2:30pm	6pm	7pm	9:15pm
Block	Side							
Hudson to Duncan	West	0	0	3	1	2	3	2
Hudson to Arcadia	East	0	11	8	7	3	4	3
Duncan to Arcadia	West	0	0	0	0	0	0	0
Arcadia to Cliffside	East	4	2	3	5	3	2	5
Arcadia to Cliffside	West	2	1	1	5	5	5	5
Parkview to Olentangy	East	0	0	0	1	1	1	0
Parkview to Olentangy	West	0	1	1	2	1	2	1
Olentangy to Kelso	East	1	0	0	1	2	2	2
Olentangy to Kelso	West	0	1	2	0	6	4	4
Kelso to Crestview	East	4	2	2	4	7	7	7
Kelso to Crestview	West	1	7	6	7	6	6	4
Crestview to Tulane	East	2	2	2	0	3	4	1
Crestview to Tulane	West	0	4	3	3	5	6	4
Tulane to Tibet	East	1	2	3	0	0	0	1
Tulane to Tibet	West	0	2	2	0	1	2	2
Tibet to Weber	East	4	2	3	4	3	3	4
Tibet to Weber	West	0	1	1	2	2	2	2
Weber to Melrose	East	3	4	1	4	7	6	4
Weber to Melrose	West	1	5	0	5	0	0	0
Melrose to Milford	East	1	8	4	7	6	6	6
Melrose to Milford	West	0	6	2	6	7	3	7
Milford to Midgard	East	4	9	6	4	3	7	10
Milford to Midgard	West	1	8	5	6	7	11	9
Midgard to Como	East	1	3	3	1	0	1	2
Midgard to Como	West	0	2	2	1	1	0	1
Como to Walhalla	East	1	0	0	1	1	0	1
Como to Walhalla	West	0	3	5	0	2	2	2
Walhalla to Clinton Hts	East	6	3	4	3	7	5	7
Walhalla to Clinton Hts	West	1	3	3	2	3	2	3
Clinton Hts to EN Broadway	East	3	1	4	3	2	3	7
Clinton Hts to EN Broadway	West	0	0	0	0	0	0	0
TOTAL OCCUPANCY		41	93	79	85	96	99	106

Appendix C: Photo Documentation

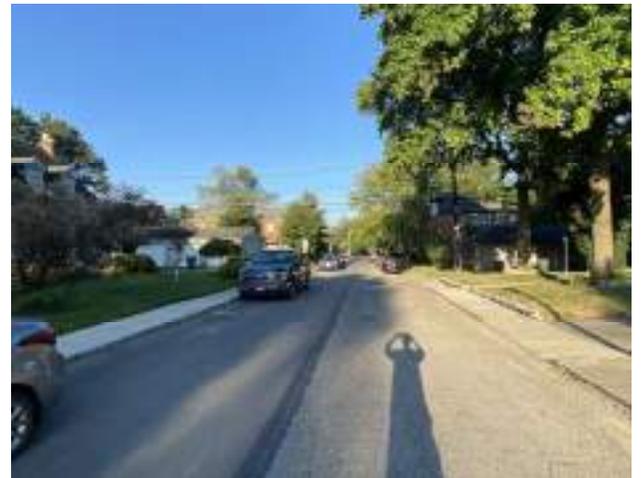
Manual counts were supplemented by photo documentation of all street blocks during each observation period.

Photos were taken during the following time periods:

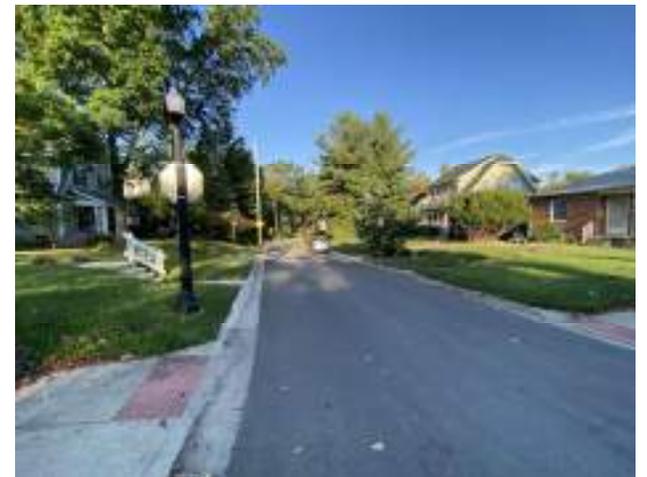
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2. 12:00 p.m. – 2:00 p.m. on Saturday, September 18, 2021
3. 2:00 p.m. – 3:30 p.m. on Saturday, September 18, 2021
4. 6:15 p.m. – 7:15 p.m. on Saturday, September 18, 2021
5. 7:15 p.m. – 7:45 p.m. on Saturday, September 18, 2021
6. 8:15 p.m. – 8:30 p.m. on Saturday, September 18, 2021
7. 10:00 p.m. – 11:00 p.m. on Saturday, September 18, 2021
8. 11:00 a.m. – 11:30 a.m. on Sunday, September 19, 2021
9. 1:45 p.m. – 2:15 p.m. on Sunday, September 19, 2021
10. 6:30 p.m. on Monday, September 20, 2021
11. 10:15 p.m. on Tuesday, September 21, 2021
12. 6:15 p.m. on Wednesday, September 22, 2021
13. 9:00 p.m. on Thursday, September 23, 2021
14. 6:45 p.m. – 7:00 p.m. on Friday, September 24, 2021
15. 9:15 p.m. – 9:45 p.m. on Friday, September 24, 2021
16. 8:45 a.m. – 9:00 a.m. on Saturday, September 25, 2021
17. 2:00 p.m. – 3:00 p.m. on Saturday, September 25, 2021
18. 5:00 p.m. – 5:45 p.m. on Saturday, September 25, 2021
19. 7:00 p.m. – 7:15 p.m. on Saturday, September 25, 2021
20. 11:15 p.m. on Saturday, September 25, 2021
21. 6:00 p.m. – 6:30 p.m. on Thursday, September 30, 2021
22. 9:00 p.m. – 9:30 p.m. on Thursday, September 30, 2021



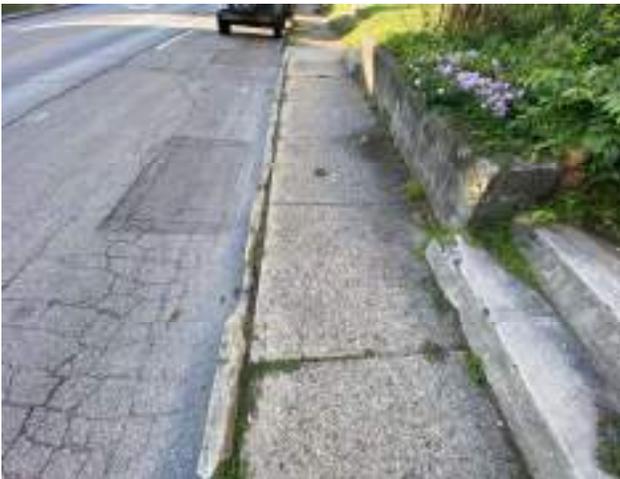






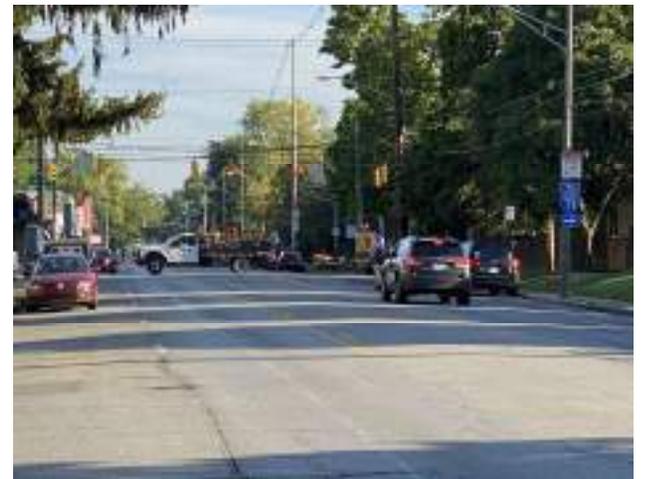






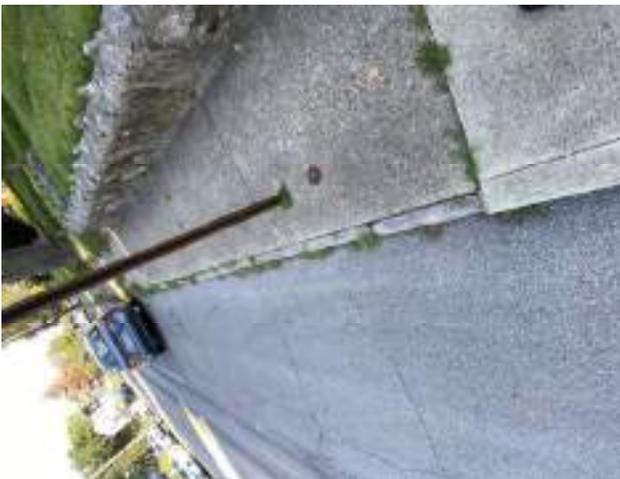


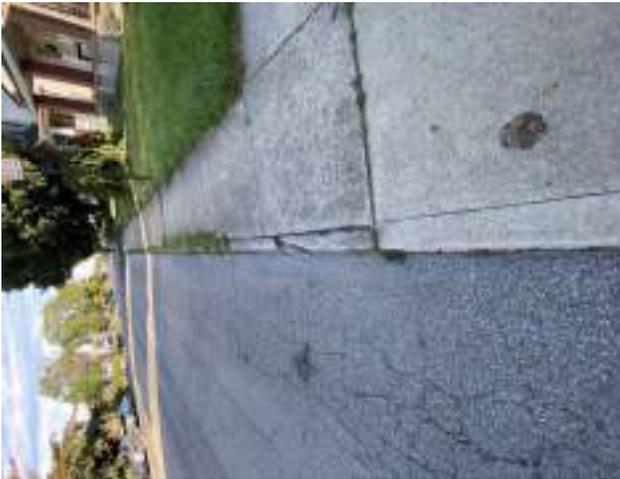




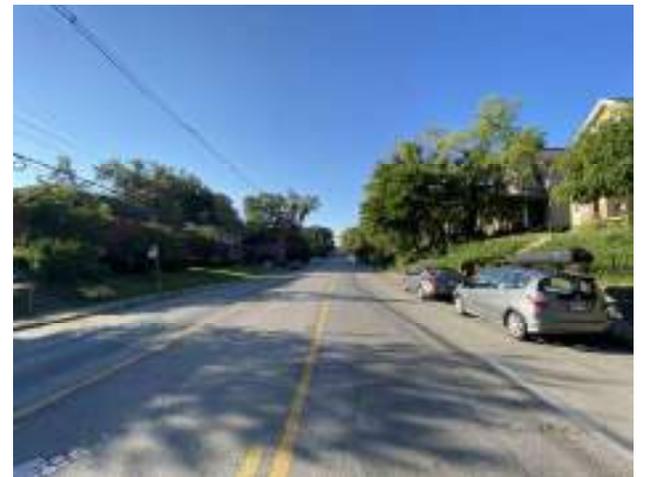




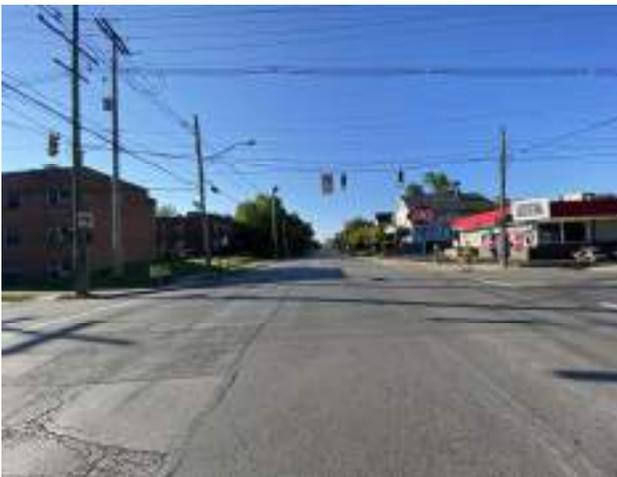














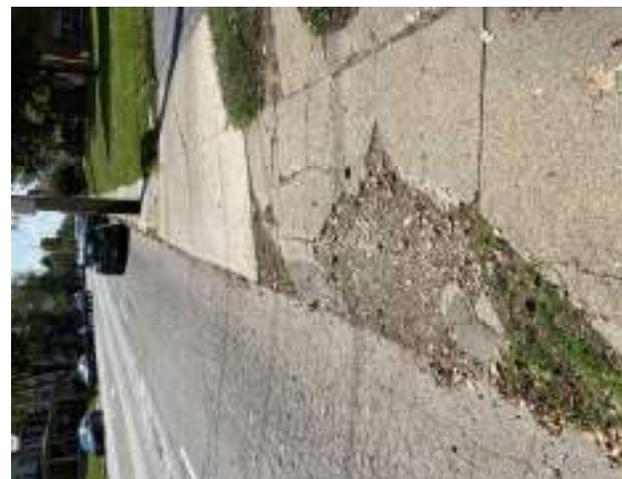
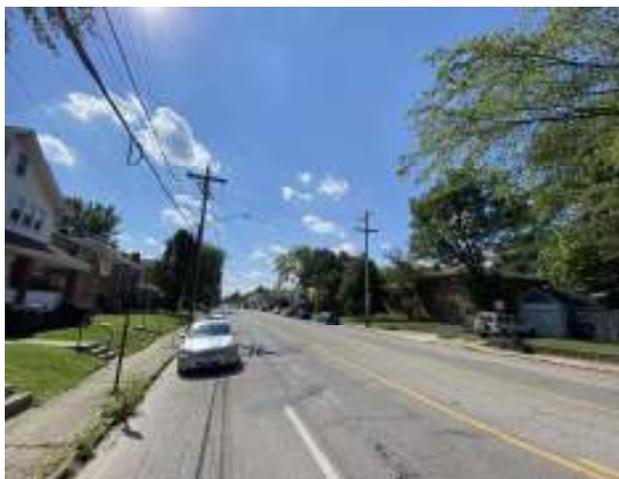












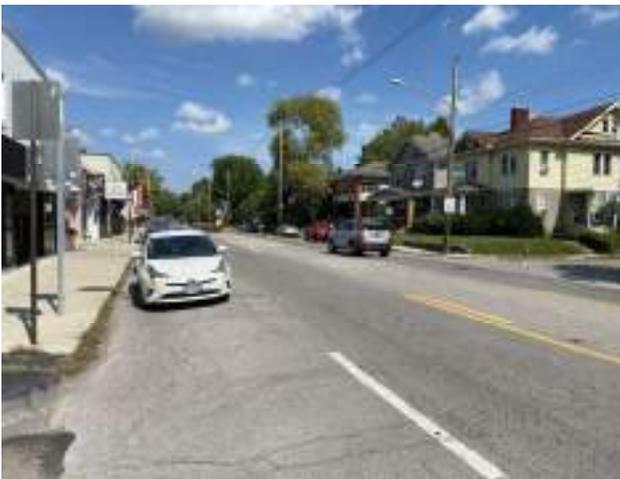




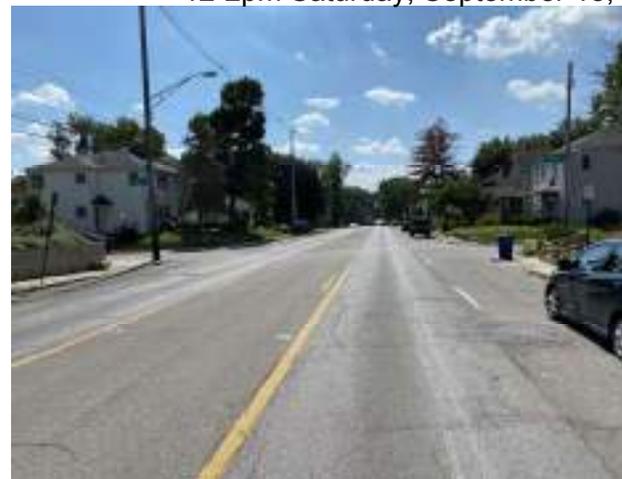




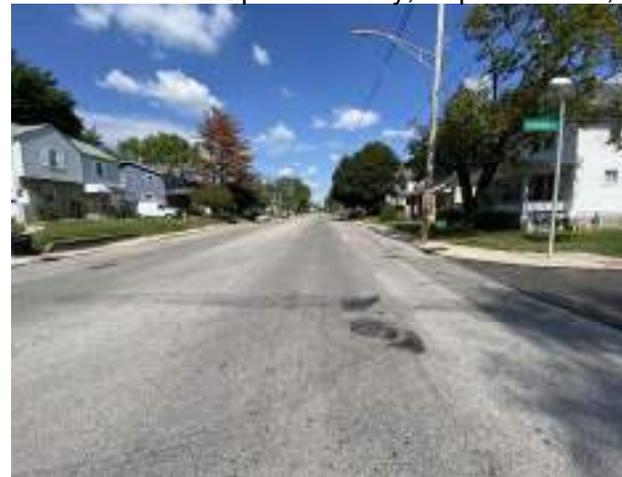














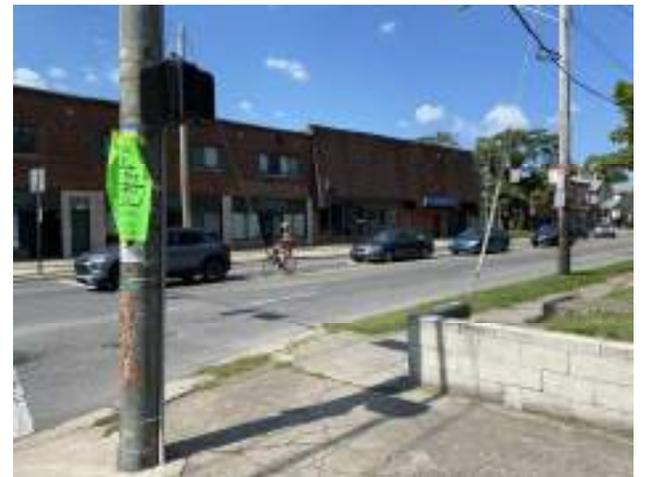






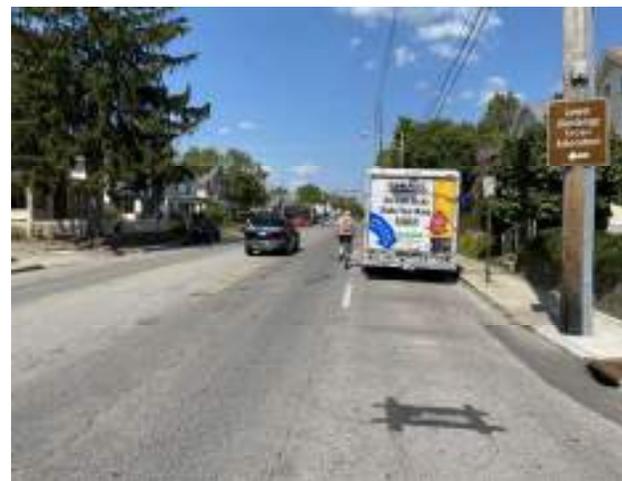
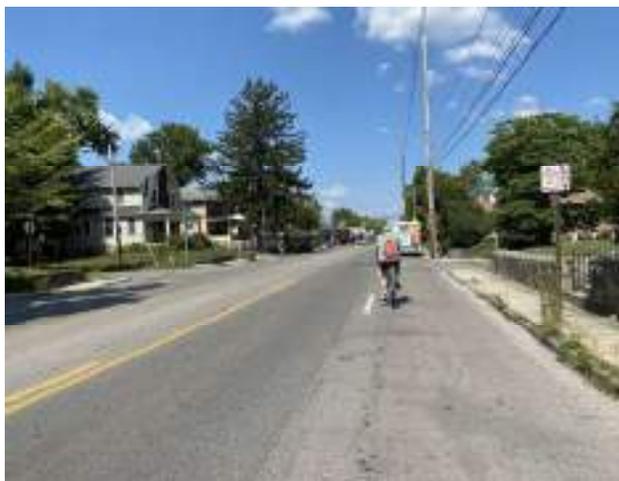
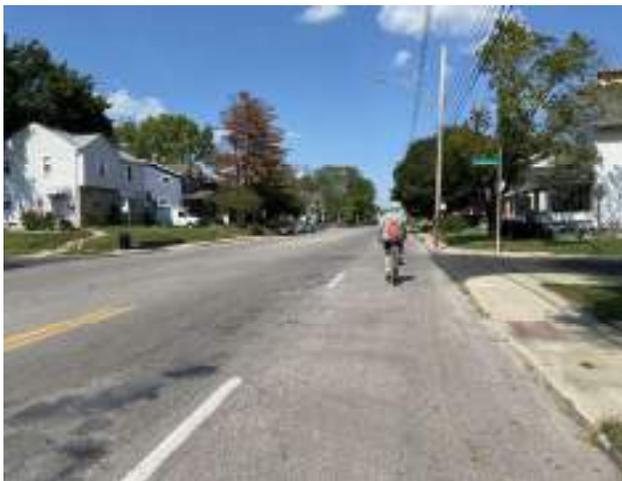
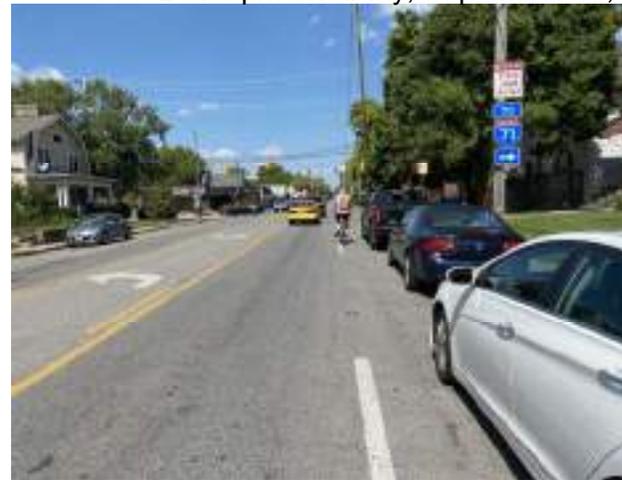


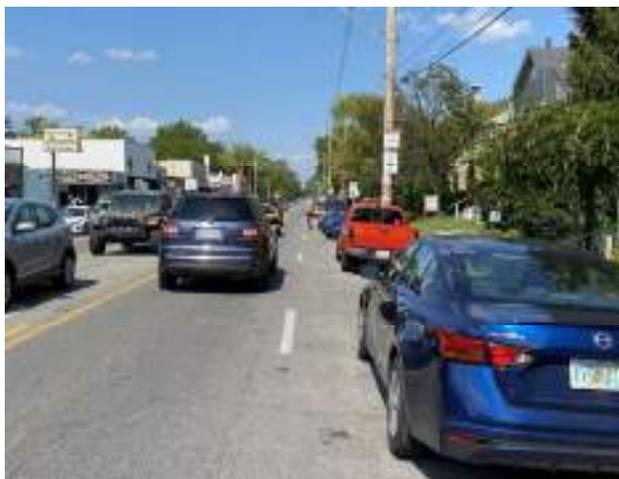
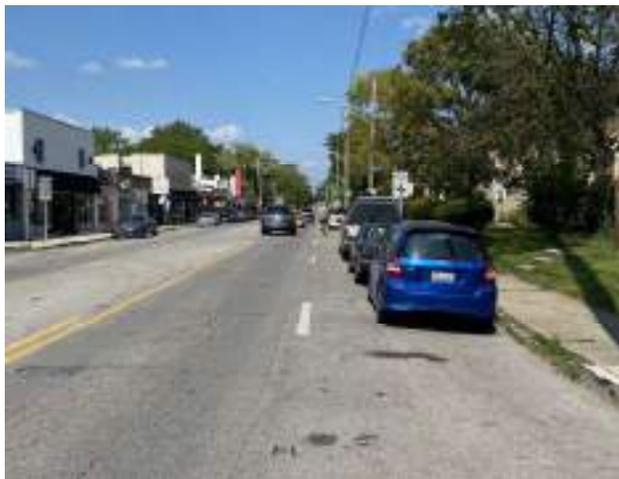


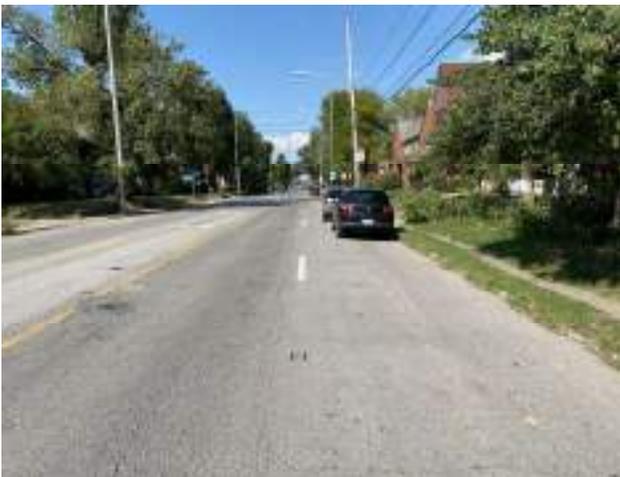


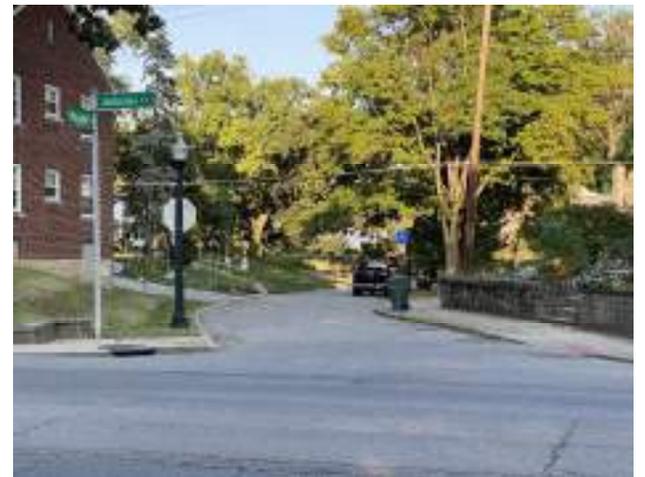


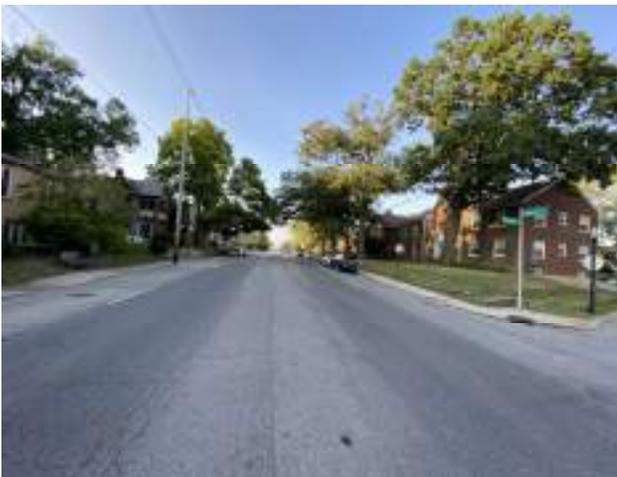


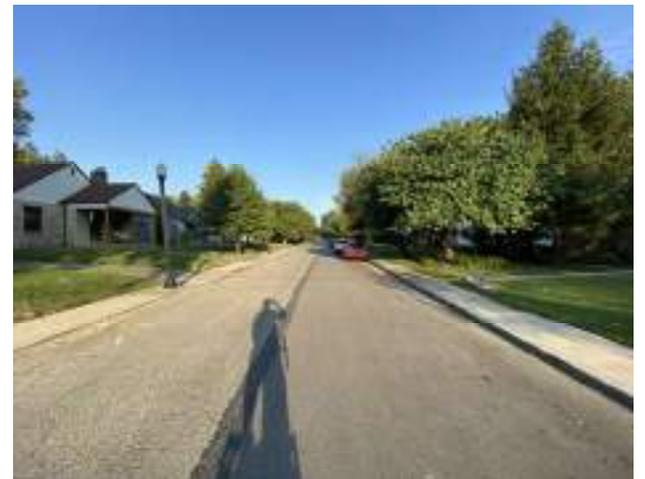
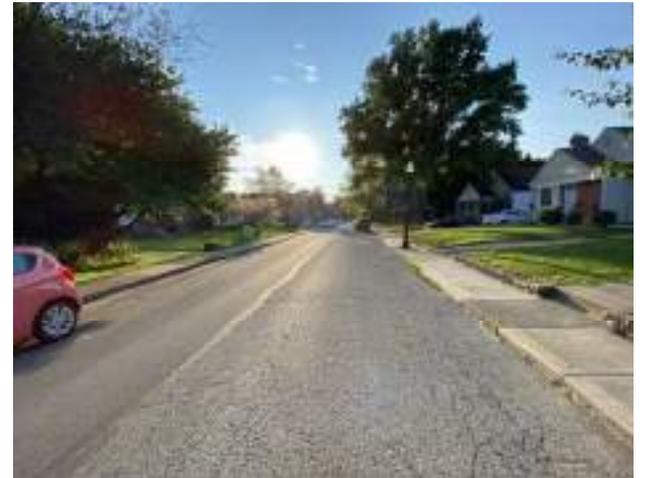








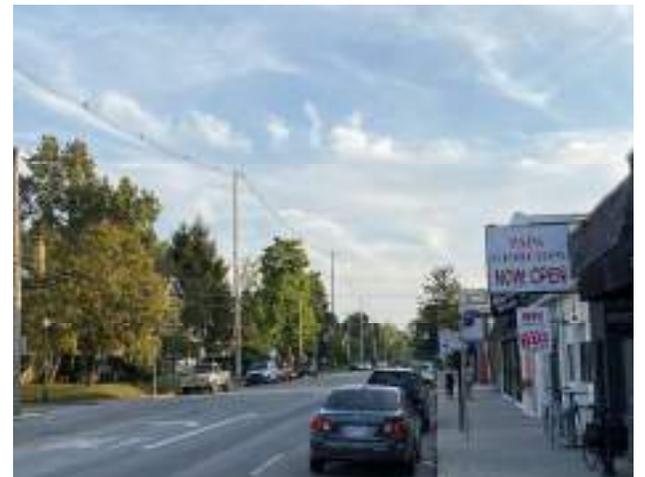






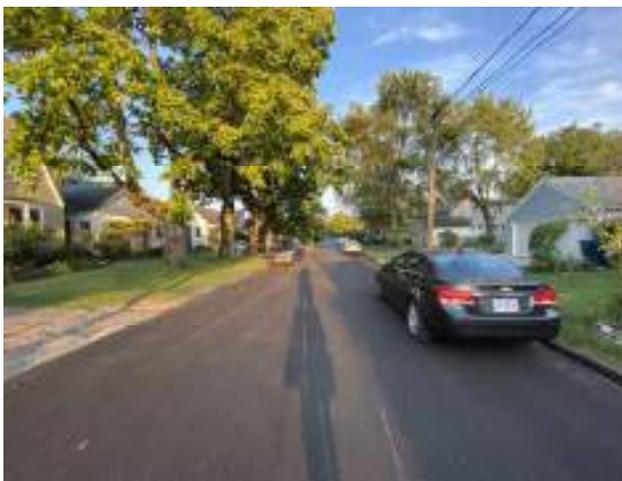
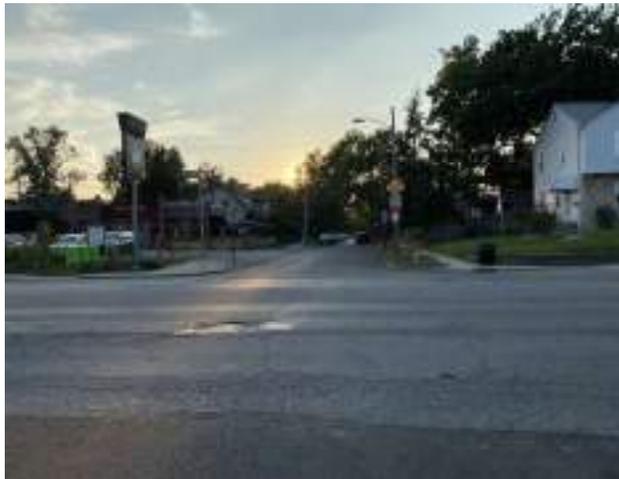


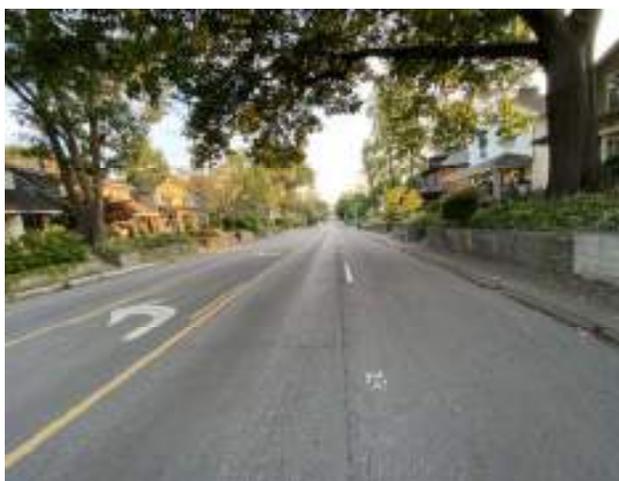
















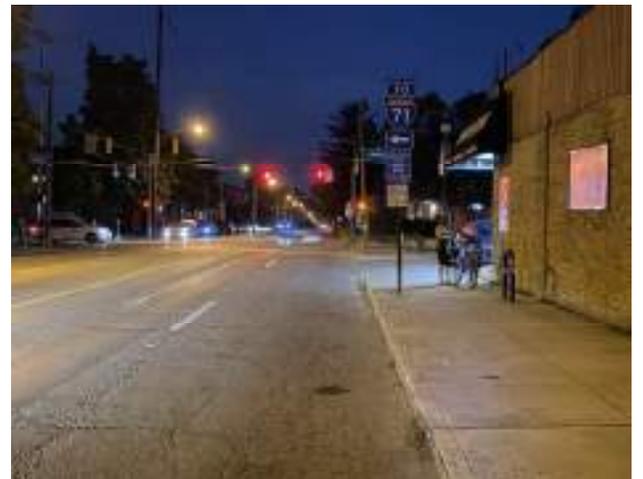




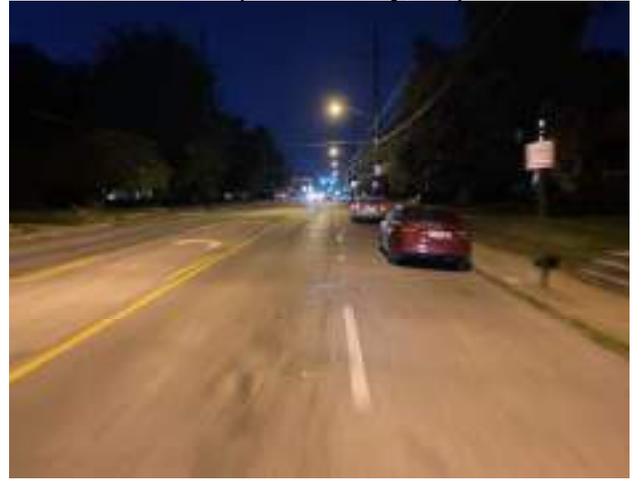












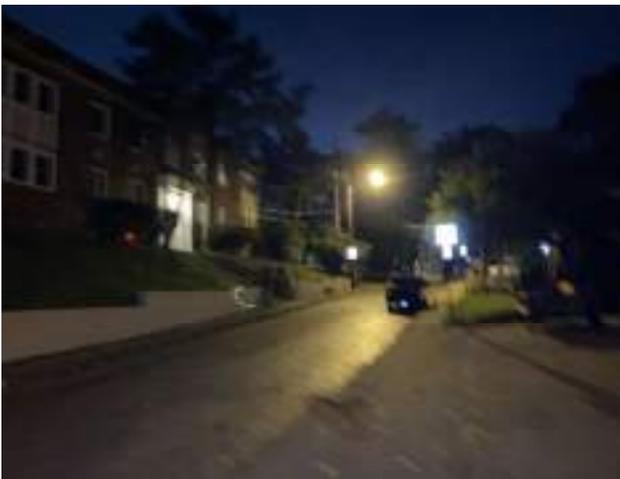


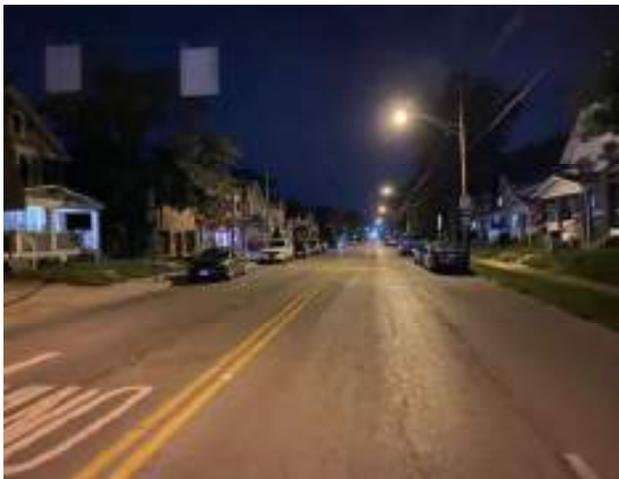


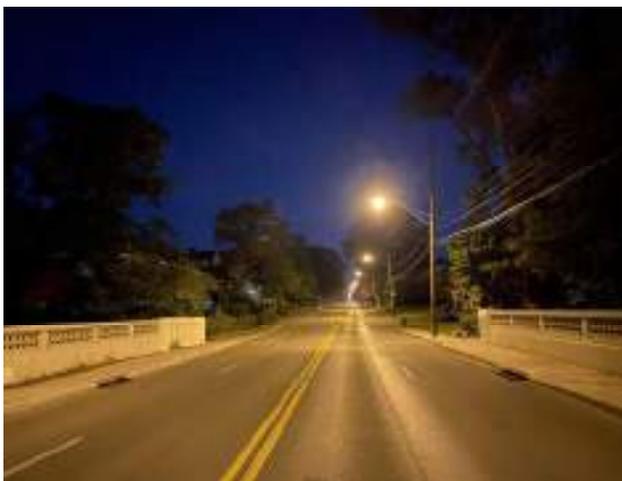
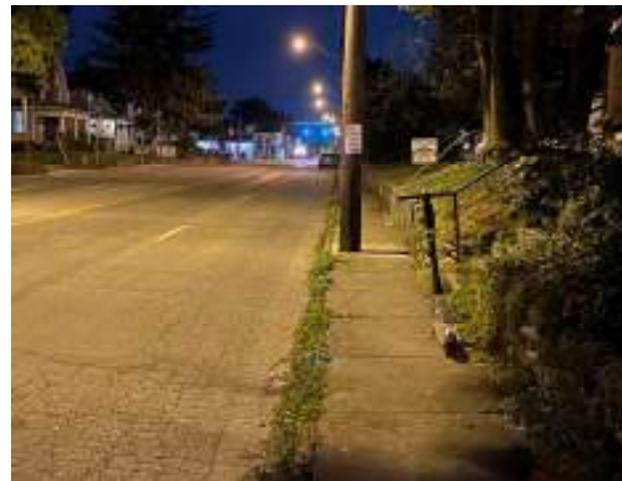


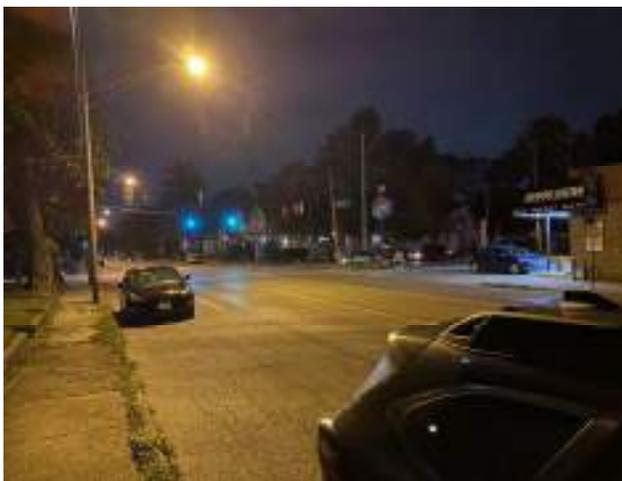












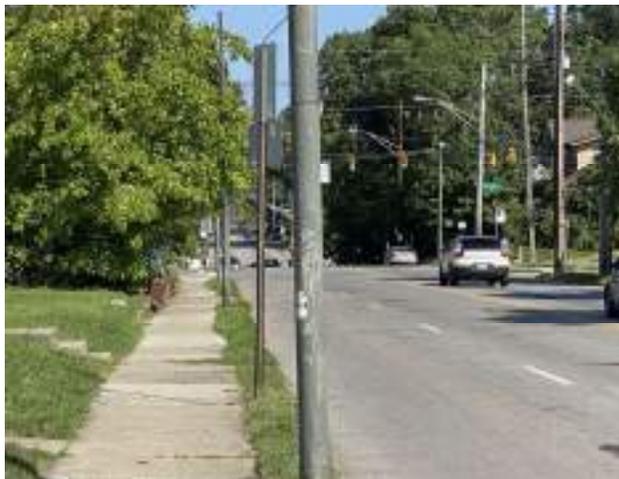




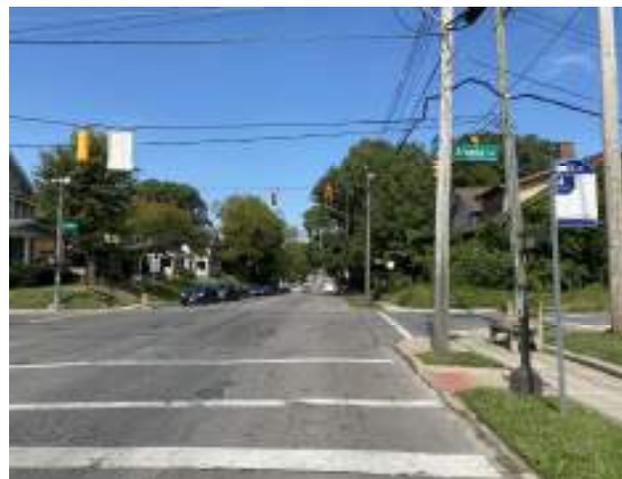
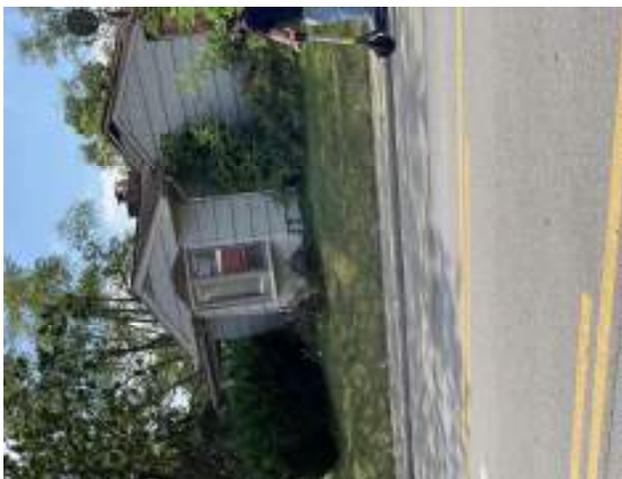












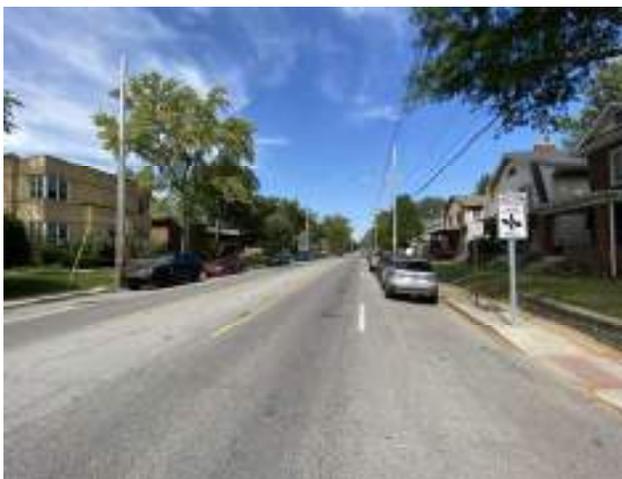








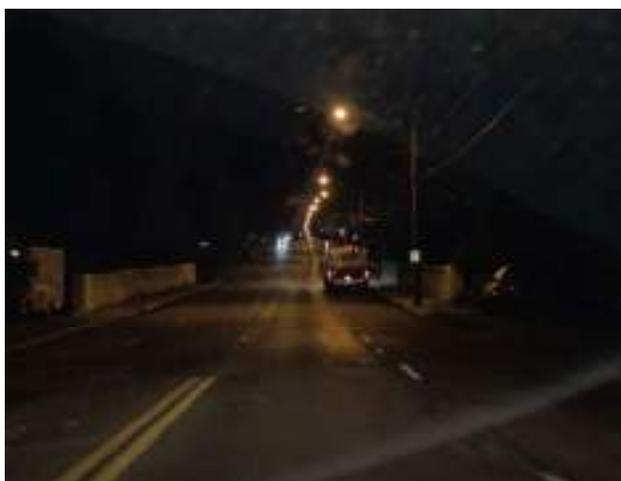
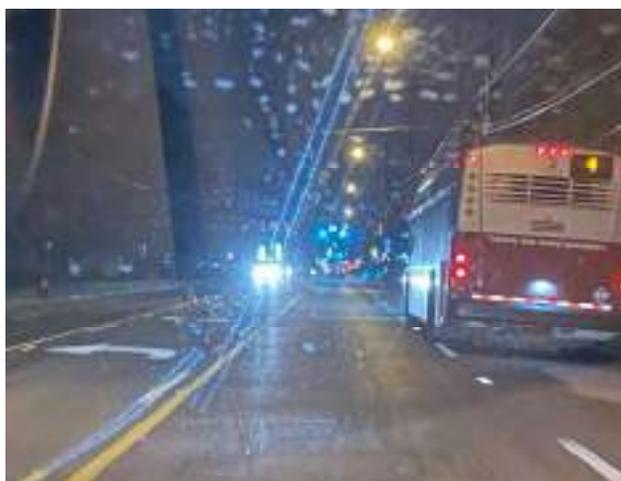


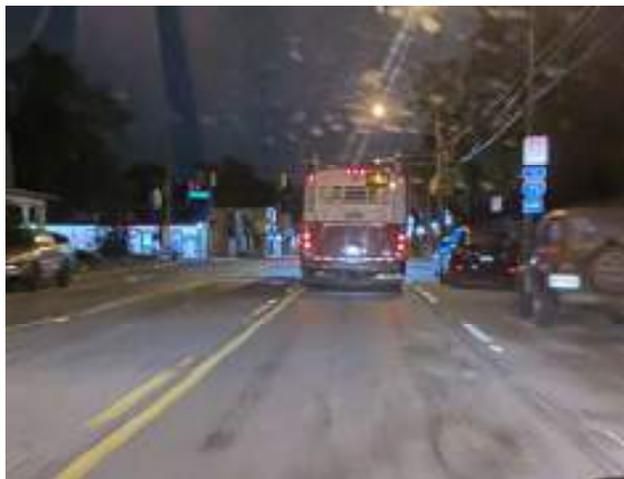




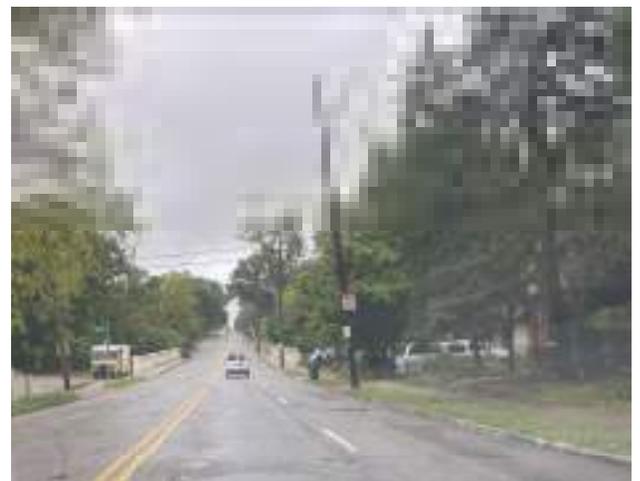








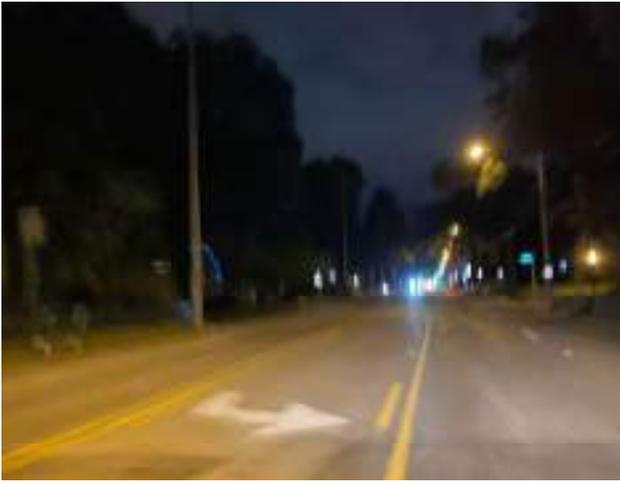












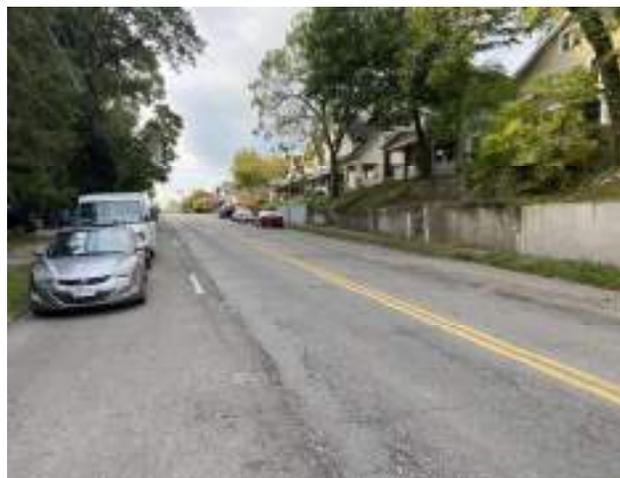










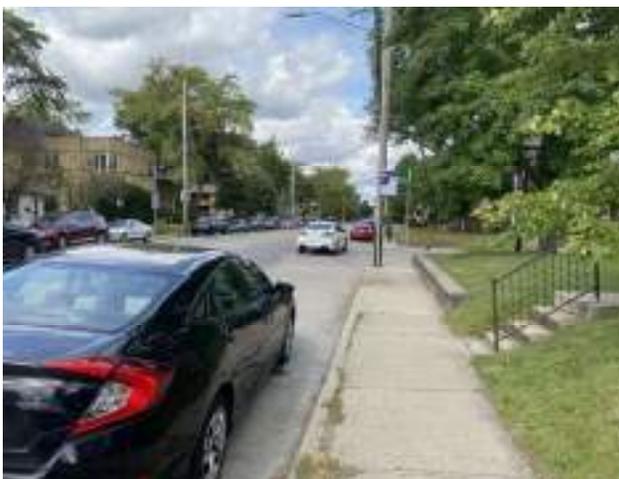




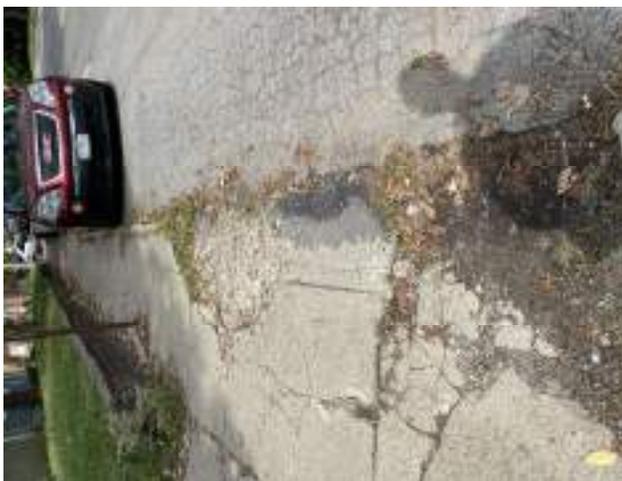
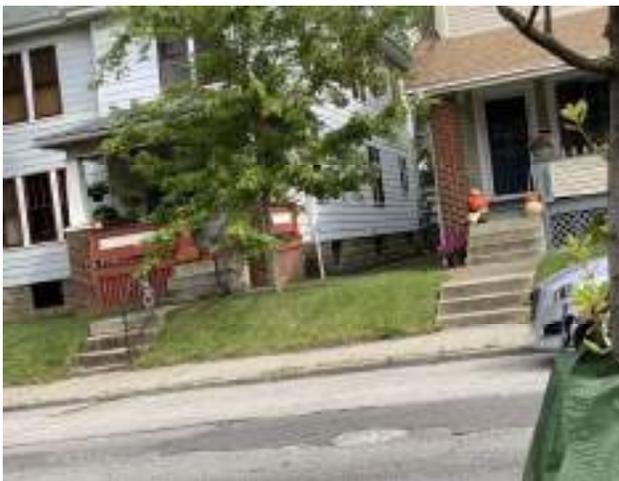




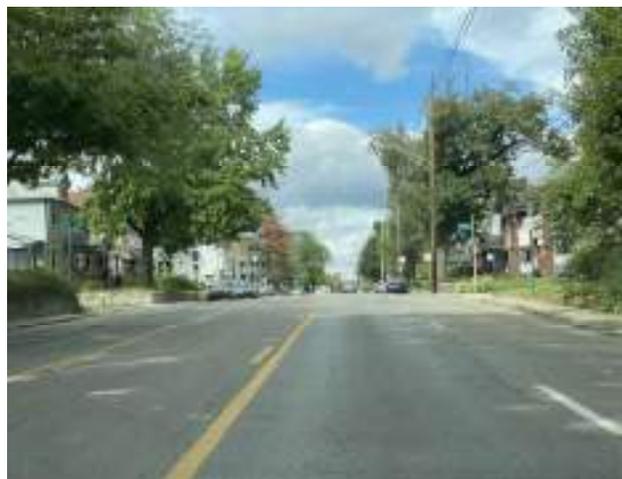














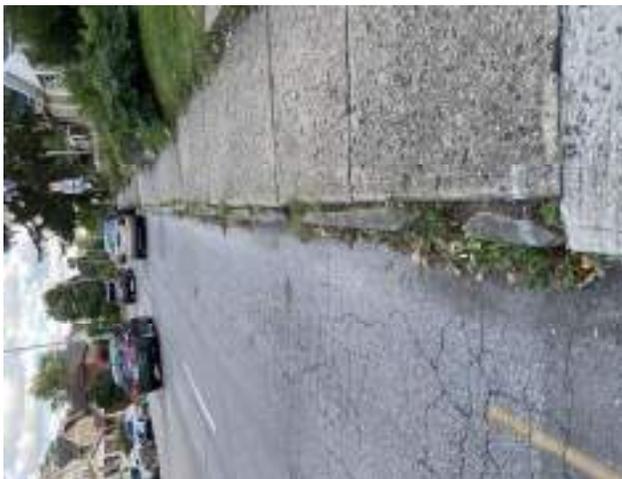






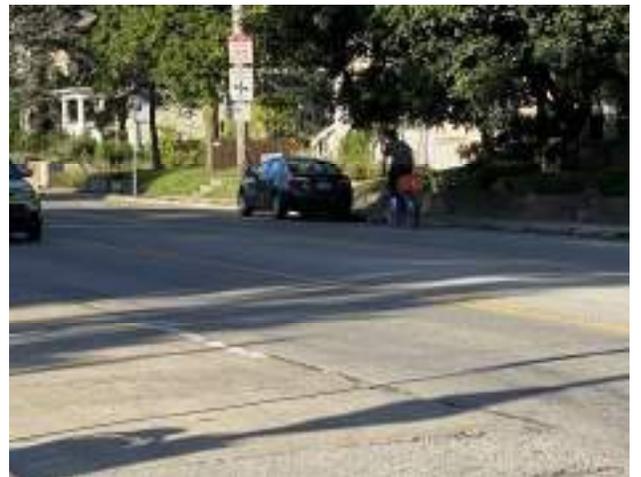






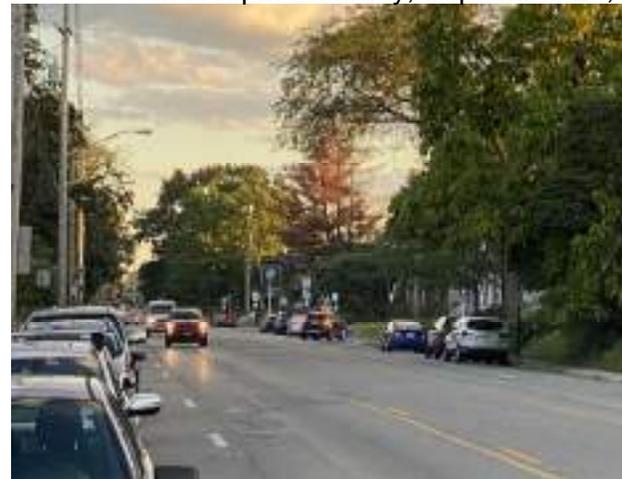




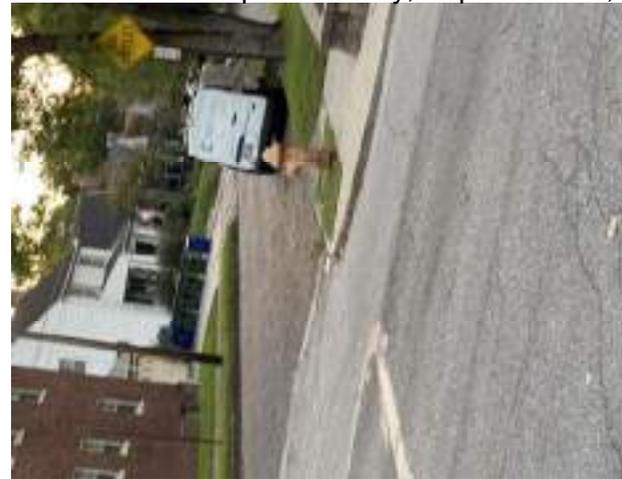


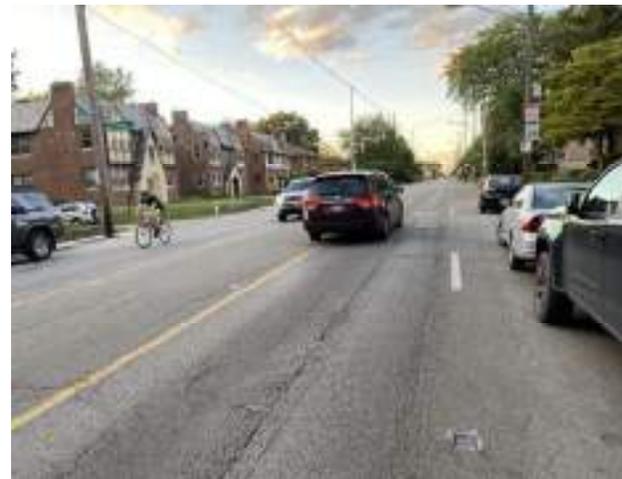
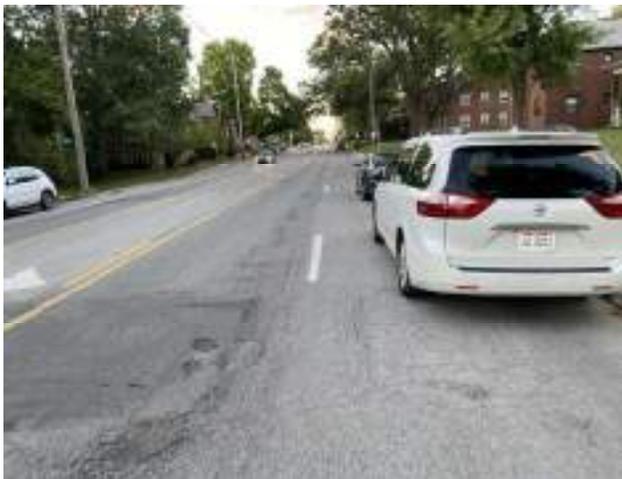
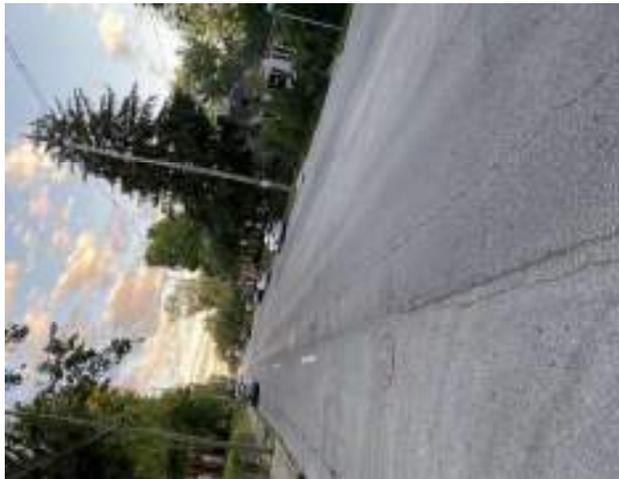














11:15pm Saturday, September 25, 2021

